

DIFFERENCE B/W SET AND LIST :

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Difference between Set and List

[1] Duplicate Elements

- List allows **duplicate elements**.
- Set does **not allow duplicates** (every element must be unique).

[2] Order of Elements

- List maintains **insertion order** (elements stay in the order you add them).
- Set does **not guarantee order**

[3] Indexing and Position

- List has **index-based access** (you can get element by `list.get(index)`).
- Set does **not have index** (no positional access). It stores data according to hashCode values (every object has unique integer value that is a hashCode value).

[4] Null Values

- List allows **multiple null values**.
- Set allows **only one null value**.

[5] When to Use

- Use List when **order matters or duplicates are allowed**.
- Use Set when **uniqueness is important**.

Operation	List	Set
Search	Slower (if searching element directly)	Faster in HashSet ($O(1)$ average)
Insertion	Faster at end	Slower if duplicates exist (needs check)

[7] Implementations

- **List Examples:** ArrayList, LinkedList, Vector
- **Set Examples:** HashSet, LinkedHashSet, TreeSet

[8] Common Use Cases

- List - To maintain ordered items like names in a roll call.
- Set - To store **unique items** like Employee IDs, Student Roll Numbers.

Feature	List	Set
Duplicates	<input checked="" type="checkbox"/> Allowed	<input type="checkbox"/> Not Allowed
Order	<input checked="" type="checkbox"/> Maintains Order	<input type="checkbox"/> No Guarantee
Indexing	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Nulls	<input checked="" type="checkbox"/> Multiple	<input checked="" type="checkbox"/> Only One
Best for	Ordered, duplicates data	Unique data